

## Pilot Scale Application of Heat-Activated Persulfate at a Former Petroleum Underground Storage Tank Area

John Haslow, PhD, PE.

Redox Tech LLC, 1006A Morrisville Pkwy, Morrisville, NC 27560

**Site History:** The site is a former petroleum underground storage tank area located in South Carolina contaminated with BTEX, MTBE and naphthalene. The site groundwater was initially treated using an air sparging system, which removed the majority of the contamination. However, after two years of air sparging, persistent concentrations of contaminants remained, predominantly in the central portion of the plume.

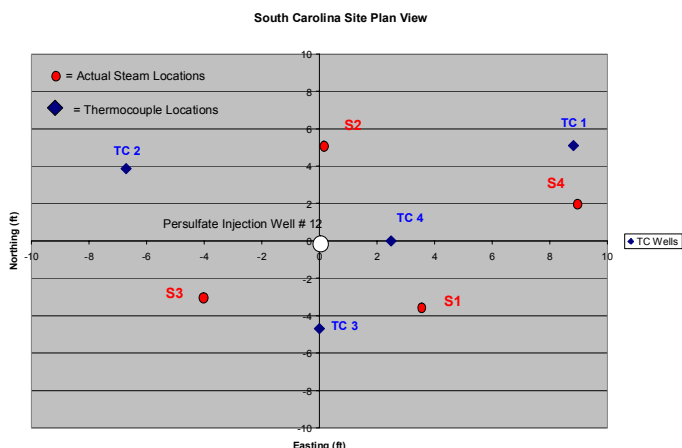


**Injection Wells at the Site**

**Pilot Scale Application Parameters:** In order to accelerate the remediation, a pilot scale test utilizing thermally-activated sodium persulfate was implemented near well MW-12 on the site. Approximately 300 gallons of an 8.8 wt% solution of FMC's Klozur™ environmental grade persulfate were injected into the well. The persulfate was heat activated by injecting steam into four points surrounding the persulfate injection well. The steam injection was not continuous;

steam was injected for approximately eight hours per day for the first three days, followed by eight hours per day for two more days one week after the first injection. Approximately ten million BTU's were injected over the total forty-hour injection period.

Thermocouple monitoring points were installed in four locations within a 12 foot radius of the persulfate injection well. Measurements were made every two feet over an 8 foot vertical interval (8 ft bgs to 16 ft bgs). Temperatures were observed to increase in all cases, and significant increases (up to 90 C) were seen in monitoring points TC2 and TC3.



**Plan View of the Persulfate Injection, Steam Injection and Thermocouple Points**

**Results:** Samples were collected seventy hours after steam injection. Thermally-activated persulfate successfully reduced all contaminants to non-detectable levels or levels below their regulatory limits. The total project costs for the pilot scale trial were \$15,000.

Time Period	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Xylenes (ug/L)	MTBE (ug/L)	Naphthalene (ug/L)
pre- air sparging	1,600	1,800	1,000	3,200	210	230
post air sparging	220	64	170	300	53	91
Post pilot	2	ND	ND	ND	2	ND

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